Investigating the Determinants of Digital Literacy among Primary School Teachers Using Structural Equation Modeling (SEM)

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DOI: https://dx.doi.org/10.47772/IJRISS.2026.100300015

Received: 02 March 2026; Accepted: 09 March 2026; Published: 24 March 2026

ABSTRACT

In the era of rapid technological advancement, digital literacy has become an essential competency for educators, particularly primary school teachers who shape students' early digital experiences. Despite ongoing efforts to integrate technology into Malaysian schools, empirical evidence on the determinants of teachers' digital literacy remains limited. This study investigates the factors influencing digital literacy among primary school teachers using the Technology Acceptance Model (TAM) as the guiding theoretical framework. A quantitative research design was adopted, and data were collected through self-administered questionnaires from 236 primary school teachers in the Northern Region of Malaysia using multistage cluster sampling. Structural Equation Modeling (SEM) was employed to examine the relationships among digital literacy, perceived usefulness, perceived ease of use, intention to use, and technology acceptance. The findings reveal that digital literacy significantly influences perceived usefulness and perceived ease of use. However, digital literacy does not directly affect teachers' intention to use technology. Instead, intention to use significantly predicts technology acceptance, highlighting its crucial mediating role within the TAM structure. These results suggest that while teachers may possess adequate digital competencies, motivational factors remain critical in translating literacy into actual technology acceptance. This study contributes to the growing body of literature on educational technology adoption by providing empirical evidence from the Malaysian primary education context. The findings offer practical implications for policymakers and educational stakeholders in designing targeted professional development programs to enhance teachers' digital competencies and support sustainable technology integration in schools.

Keywords: digital literacy, digital technology, technology acceptance model, structural equation modeling, primary school teacher

INTRODUCTION

Globally, digital technology has advanced rapidly in the 21st century. The era started when the first computer was introduced to the world in the middle of the 20th century. Over time, many digital technologies have been developed with various advantages and improved functionalities such as intelligent grids that use Internet of Things (IoT) sensors, advanced analytic tools, augmented reality (AR) technology, holograms and even QR code applications (Halim et. al, 2023; Goh et al., 2024). Development in digital technologies has led to Information Communication Technology (ICT), which has become the most innovative field of technology and a pioneer of innovation in other sectors (World Bank, 2024). It proved that digital technology significantly affects every industry, including economies, agriculture, and health.

Malaysia also took the initiative to advance digital technology to enhance its citizens' well-being. In September 2021, the Malaysian government launched MyDigital as a government initiative to turn Malaysia into a high-income nation driven by digital technology and a leading player in the digital economy within the region (Santhanamery et al., 2024). Santhanamery supports national development strategies like the Twelve Malaysia Plan (RMKe-12) and Wawasan Kemakmuran Bersama 2030 (WKB 2030). In addition, MADANI Digital Trade (MDT) was launched on the 13th of March 2025 to enhance economic growth in Malaysia (Chooi, 2025). The launch of this platform also aligned with the new framework, MADANI economy introduced by Prime Minister Datuk Seri Anwar Ibrahim to enhance the Malaysian economy (Natrah, 2023), with one of the seven keys being the world's top 30 economies. It shows how digital transformation is crucial in a nation's development.

Not only sectors such as water sectors, hospitality and tourism, but education is also one of the industries that significantly impacts a nation's development and reputation. Education is essential for the advancement of a country. Okerekeoti (2022) identified a significant positive relationship between government spending on education and actual gross domestic product (RGDP) in Nigeria, where an increase of one naira in expenditures on education will lead to a 64% rise in RGDP. It indicated that a lack of education leads to less economic progress for a country. Therefore, the application of digital technology in education has also become a norm such as to explore the critical thinking development of undergraduate and graduate students (Meirbekov et. al, 2022) and initiate a green university (Zou et. al, 2024). Moreover, Dewanto et al. 2024 found a positive relationship between digital literacy and teacher performance, which emphasized that teachers must possess the necessary knowledge to enhance their teaching.

Based on Oxford Learner's Dictionaries, digital was derived from the Latin word digitalis in the late 15th century. It came from digitus, which meant "*finger and toe*". Digital technology may have various interpretations; however, this research is referred to explicitly as being associated with computer technology, particularly the Internet. Meanwhile, literacy was defined as expertise or abilities in a particular field. Hence, digital literacy (DL) was generally described as skills or understanding related to computer technology, specifically the Internet. Nevertheless, Gilster was the first to introduce the concept of DL in 1997 (Pangrazio et al., 2020; Reddy et al., 2020). He suggested that DL was an action or process gaining valuable information from various online sources (Agustina, 2021; Pangrazio et al., 2020; Reddy et al., 2020). Meanwhile, Reddy et al. (2020) concluded that DL was the ability of an individual to find and evaluate information and use it effectively by creating new content and sharing and communicating the newly created information using appropriate digital technologies. They also summarised that the development of ICT significantly affected several fields, such as employment, education, health care, and environmental sustainability. Hence, in this study, digital literacy is defined as a teacher's ability to find, evaluate, and utilise information extracted from the Internet using digital technologies such as smartphones and laptops.

Even though five years have passed since the COVID-19 pandemic, several teaching and learning methods conducted during the pandemic are still being used in education. Classes are conducted online when situations cannot be avoided, such as emergencies, traffic congestion during festive seasons, or infected with contagious diseases where teachers or students cannot attend the class physically. Teachers are essential in guiding students to use more digital technologies in their studies. Sulaiman et al. (2023) surveyed to investigate Malaysian secondary school teachers' digital information literacy competencies in teaching ICT-based projects. The study suggested that teachers must possess the necessary knowledge of technologies to ensure they are competent to teach students. Knowledge of technologies may help teachers explain tools, give more ideas to prepare for their projects, and explain how to extract credible online sources.

Besides, Zheng et al. (2024) also suggested that digital literacy (DL) significantly affected online learning power with either low or high perceived teacher support, which supported the statement and was aligned with the previous study. A study by Al-Abdullatif and Alsubaie (2022) also proved the digital platform named *"I Read Arabic"* helped teachers teach and improved students' lessons in Arabic. Therefore, it shows how advancements in digital tools and platforms in this 21st century may positively impact education, such as more virtual learning, attractive and dynamic lessons, and facilitate teachers' tasks efficiently.

Problem Statement

Since education is vital for the development of a country, the Ministry of Education introduced an online learning platform in 2019 to cope with the COVID-19 pandemic, and it was branded DELIMa in 2020. Even after the pandemic ended, this platform is still being used in face-to-face teaching and learning to bring a more engaging learning environment for teachers and pupils in schools (Ministry of Education Malaysia, 2023). Minister of Education, Fadhlina Sidek, emphasized that one of the six pillars of the Digital Education Policy is the development of competent digital educators, underscoring the crucial role of digitally literate teachers (Hakim, 2023). Moreover, she also mentioned that 2027 the Year One students will be learning artificial intelligence (AI) for better digitally savvy students (Rajaendram, 2024).

It was reported that despite the high vision for future education, only 2.2% of teachers had an advanced level in digital competence evaluation in 2021, while the remaining only had an intermediate and basic digital knowledge. Not only were there low numbers of teachers with advanced digital learning, but many schools were still in rural areas, with the enrolment of primary school students higher than in urban areas until Jun 2020 (Tukiar et al., 2022). According to the study, even though the Southern Region had the highest number of schools in rural areas, the Northern Region had the most schools with poor conditions. These situations will worsen things as fewer facilities can be accessed by teachers or students.

Better insights into digital literacy among teachers can be investigated by exploring the significant factors associated with it. The Technology Acceptance Model (TAM) was frequently used among researchers to examine the relationship between digital literacy and existing factors in the model (Kabakus et al., 2023; Santhanamery et al., 2024). However, many studies conducted focused on different levels of education or groups, such as vocational or secondary schools and pre-service special education teachers (Antoniettie et al., 2022; Mailizar et al., 2022; Yao & Wang, 2024). Therefore, this research was carried out to address the gap in the earlier studies regarding the significance of digital literacy among primary school teachers.

Therefore, the main objectives of the research were summarized as [1] to investigate the determinants of digital literacy among primary school teachers in the Northern Region; [2] to develop a model of digital literacy based on the technology acceptance model (TAM); and [3] to analyse the developed model using structural equation modeling (SEM).

METHODOLOGY

Research Design

This study applied a quantitative approach by administering online questionnaires to the target respondents. The research design ensured that every objective could be appropriately answered. A pilot study was conducted before the questionnaire was administered to ensure that any underlying factors that should be included or excluded could be identified thoroughly by the researcher. The responses in the questionnaire were specified in a specific range to ensure that the questionnaire could be analysed quantitatively.

Population and Sampling

The population focused on in this study was all primary school teachers in the Northern Region of Malaysia, including Perlis, Kedah, Penang, and Perak. According to the Malaysian Department of Statistics, 50328 teachers had been hired by the government until 2021. The sample size was calculated using Cochran's formula since the population was large (Ahmed, 2024). The minimum sample calculated was 382 teachers, however due to limited time for data collection, only 236 teachers were successfully collected as respondents.

This study implemented a probability sampling method since it ensures that every element has an equal chance to be chosen as a representative of the population (Awang, 2012). Multistage cluster sampling was selected due to the large population size, limited time, and limited human resources. The clustering method divided the population into four states: Kedah, Perak, Penang, and Perlis. Next, each state was clustered into its respective districts. Kedah has 13 districts, Penang has seven, Perak has 12, and Perlis has six. After one district from each state was chosen, the list of schools in the selected districts was collected from their respective district education offices (PPD) and adapted as the sampling frame. Finally, half of the schools from the sampling frame were chosen randomly. Then, the questionnaire was administered online to the chosen schools via email and answered by all teachers in the respective schools.

Research Instrument

The questionnaire consisted of two sections. The first section included demographic profiles such as gender, age, subjects they teach, how long they have been teaching and using computers, and which schools they attended. This section used an open-ended questionnaire. Next, in the second section, there were five variables: digital literacy, teachers' intention, teachers' acceptance, perceived ease of use, and perceived usefulness. There were about 8 to 9 items in each variable. All items used a 10-point Likert scale due to its precision (Taherdoost, 2019; Sangthong, 2020) and the preferences of person to have more options in expressing feelings (Taherdoost, 2019). DL used 10-point Likert scales which specified illiterate (1) to most literate (10), while the remaining variables used strongly disagree (1) to strongly agree (10). The researcher adjusted the items related to the study by referring to the previous studies (Badi et al., 2024; Belmonte et al., 2024; Wang et al. 2024; Yao and Wang, 2024).

Data Collection Method

A pilot study was conducted before administering the questionnaire to the target sample. According to Bujang et al. (2024), since the reliability analysis of Cronbach's alpha was applied to assess the instruments, a minimum of 30 samples was needed for the pilot study after considering the 20 percent non-response rate. The pilot study was applied to ensure that all items in the questionnaire are clear and can be answered without any ambiguity. Meanwhile, corrections can be made to any weakness in the questionnaire and its instruments (Awang, 2012). Besides that, the questionnaire underwent a screening process by experts.

Thirty-nine teachers were involved in the pilot study for this research. After the pilot study, some corrections were made since some questions confused the respondents. After the questionnaire had been amended according to the experts and responses from the pilot study's respondents, the questionnaires were emailed to the selected primary schools. A total of 236 respondents were collected due to limited time for data collection.

Ethical Approval

All aspects and protocols of this study were reviewed and approved by the Research Ethics Committee of Universiti Teknologi MARA (UiTM) (REC/02/2025) (ST/MR/21).

Theoretical Framework

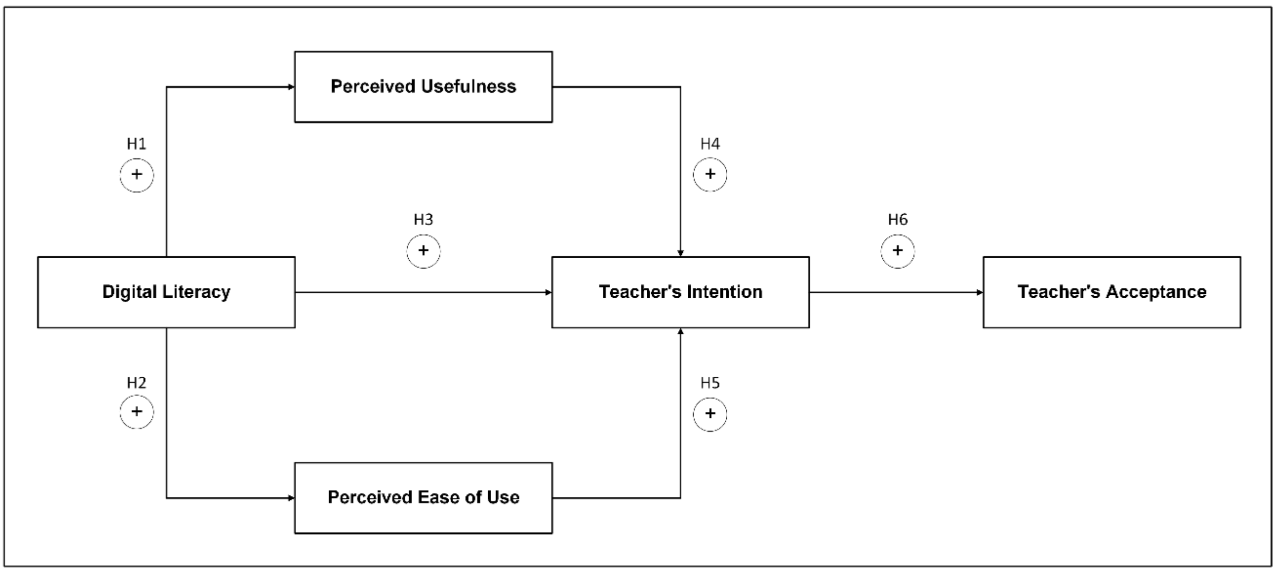

Figure 1: Theoretical Framework

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue III March 2026

A model of digital literacy was developed using an existing model, the TAM. The developed model comprised five attributes: digital literacy (DL), perceived usefulness (PU), perceived ease of use (PEOU), teachers' intention (TI), and teachers' acceptance (TA). The theoretical framework is shown in Figure 1.

There were six hypotheses proposed in the study, as shown:

H_1: There is a significant relationship between digital literacy and perceived usefulness.

H_2: There is a significant relationship between digital literacy and perceived ease of use.

H_3: There is a significant relationship between digital literacy and teachers' intention.

H_4: There is a significant relationship between perceived usefulness and teachers' intention.

H_5: There is a significant relationship between perceived ease of use and teachers' intention.

H_6: There is a significant relationship between teachers' intention and teachers' acceptance.

Exploratory Factor Analysis (EFA)

Before proceeding to the factor analysis, the Kaiser-Meyer-Olkin (KMO) value and Bartlett's Test of Sphericity must meet the specific requirements. The analysis was conducted by using SPSS. The final data collection of 236 respondents was used to run the analysis since a minimum of 100 samples is needed for the test. The KMO and Bartlett's Test of Sphericity must achieve values which were above 0.6 and significance values less than 0.05, respectively to run the FA.

EFA was conducted after all the requirements for the KMO measure and Bartlett's Test of Sphericity were met. The analysis was conducted by using the responses from the pilot study. All items must have a factor loading above 0.6 to be kept (Awang, 2012).

Reliability Analysis of Instrument

Reliability analysis was performed after conducting EFA to make sure all the items in each factor provide a reliable measure of internal consistency (Awang, 2012). Cronbach's alpha was used to check reliability, and measurements must be above 0.6 or higher to indicate that the items are reliable. All three analyses were performed using SPSS.

Structural Equation Modeling (SEM)

The study conducted the SEM analysis using AMOS. Three elements need to be proven for a good measurement model: one-dimensionality, validity, and reliability. All the measurements used in the study were referred to the book of Research Methodology and Data Analysis, Second Edition by Awang (2012).

Unidimensionality

The unidimensionality of the measurement model is achieved when any item with a low factor loading is deleted (Awang, 2012). The analysis used to obtain the factor loading is confirmatory factor analysis (CFA). There are different scales for newly developed and already established, which are above 0.5 and 0.6, respectively. Since the model used was established, the items must exceed 0.6. The items with factor loading below 0.6 should be deleted one at a time, with the lowest factor loading first, and re-analysed until the unidimensionality is achieved. A single measurement of each latent variable which were digital literacy (DL), perceived usefulness (PU), perceived ease of use (PEOU), teachers' intention (TI), and teachers' acceptance (TA) were used to assess the unidimensionality where each factor loading of the items within its variable was above 0.6.

Validity

Three types of validity need to be achieved for each measurement model: convergent, construct, and discriminant. All the measurements are shown in Table 1.

Table 1**.** Measurement of Validity and Level of Acceptance

Types of Validity	Acceptance Value	
Convergent	Verified when average variance extracted (AVE) is greater than or equal to 0.5	
Construct	Goodness of fit index (GFI)	Above 0.90
	Comparative fit index (CFI)	Above 0.90
	Root mean square error of approximation (RMSEA)	Below 0.08 (Range 0.05 to 0.1 is acceptable (Awang, 2015)
	Ratio of chi-square and degrees of freedom (Chisq/df)	Below 5.0
Discriminant	Achieved when the measurement model is free from redundant items.	

Reliability

The reliability of the measurement model was assessed to ensure the model was reliable enough to measure the respective latent construct. The criteria needed to be achieved are shown in **Table 2**, while the calculation for AVE and composite reliability (CR) is shown in **Table 3**.

Table 2. Measurement of Reliability and Level of Acceptance

Criteria	Level of Acceptance
Internal reliability	Achieved when the Cronbach's alpha value is above 0.7
CR	CR value greater than or equal to 0.6
AVE	AVE value greater than or equal to 0.5

Table 3. CR and AVE Formula

$CR = \frac{(\sum K_i)^2}{(\sum K_i)^2 + \left(\sum 1 - {K_i}^2\right)}$	Where K_i is the factor loading of every item, and n is the number of items in the model
$AVE = \frac{\sum {K_i}^2}{n}$	

Normality Assessment

Before proceeding to SEM, the normality of data must be assessed (Awang, 2012). It was done after all the fitness indexes, validation, and reliability of the model had been achieved. The normality can be assessed using skewness and kurtosis, shown in the output of the assessment of normality in AMOS. The skewness value must be below 1.0 or between -1.0 to 1.0 for the data to be normally distributed (Awang, 2015; Sarkam, 2025). It can also be observed based on the kurtosis value within ±1 (Sarkam, 2025); however, since the Maximum Likelihood

Estimator (MLE) was used in AMOS, it was already robust to kurtotic violations only if the sample size is large (Awang, 2015).

Suppose the normality of the data is not achieved. In that case, the deletion of outliers can be done by observing the farthest distance of the data using the Mahalanobis distance. The measurement model needs to be re-analysed after each deletion. Besides, non-normal items can also be deleted (Awang, 2015). After the normality of data had been achieved, a structural model was constructed based on the final pooled measurement model. The fitness indexes of the model were also assessed, like other measurement models. Finally, variables' regression weights and probability value were observed to analyse whether they were significant and whether the hypotheses could be accepted.

RESULTS AND DISCUSSION

Exploratory Factor Analysis (EFA)

Based on Table 4, as the value of the KMO measure is above 0.6 and closer to 1.0, the sample size for conducting factor analysis is adequate. The Bartlett's Test of Sphericity also shows a significant value (p-value < 0.05); hence it is appropriate to run the factor analysis.

Table 4. KMO and Bartlett's Test of Sphericity

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.981
Bartlett's Test of Sphericity	Approx. Chi-Square	18946.390
	df	1035
	Sig.	< 0.001

After conducting KMO and Bartlett's Test of Sphericity, exploratory factor analysis was conducted to assess the factor loading of each item in all variables. The results of factor loading coefficients for all items are shown in Table 5.

Table 5. Factor Loading Coefficients for All Items during EFA

Variables	Items	Factor Loading	Validity (> 0.60)	Variables	Items	Factor Loading	Validity (> 0.60)
DL	DL1	0.715	Yes	TI	TI1	0.720	Yes
	DL2	0.789	Yes		TI2	0.871	Yes
	DL3	0.776	Yes		TI3	0.902	Yes
	DL4	0.809	Yes		TI4	0.843	Yes
	DL5	0.630	Yes		TI5	0.817	Yes
	DL6	0.797	Yes		TI6	0.635	Yes
	DL7	0.649	Yes		TI7	0.869	Yes
	DL8	0.412	No		TI8	0.715	Yes

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue III March 2026

	DL9	0.611	Yes		TI9	0.783	Yes
	DL10	0.443	No				
PU	PU1	0.698	Yes	TA	TA1	0.782	Yes
	PU2	0.624	Yes		TA2	0.805	Yes
	PU3	0.705	Yes		TA3	0.645	Yes
	PU4	0.704	Yes		TA4	0.736	Yes
	PU5	0.794	Yes		TA5	0.671	Yes
	PU6	0.799	Yes		TA6	0.842	Yes
	PU7	0.752	Yes		TA7	0.845	Yes
	PU8	0.639	Yes		TA8	0.692	Yes
	PU9	0.727	Yes		TA9	0.808	Yes
PEOU	PEOU1	0.689	Yes				
	PEOU2	0.706	Yes				
	PEOU3	0.904	Yes				
	PEOU4	0.800	Yes				
	PEOU5	0.851	Yes				
	PEOU6	0.855	Yes				
	PEOU7	0.809	Yes				
	PEOU8	0.701	Yes				
	PEOU9	0.639	Yes				

The result shows that all items in each variable are valid since they have a factor loading value above 0.6, except for DL8 and DL10. The items were deleted before proceeding to the CFA since they were useless to be kept in the measurement model (Awang, 2015).

Reliability Analysis of Instrument

A reliability analysis of the instrument was conducted after EFA to ensure that all the remaining items were reliable in their variables. Table 6 shows the output obtained from SPSS. The value of Cronbach's alpha must be more than or equal to 0.6 to be accepted (Awang, 2012). Since all Cronbach's alphas are above 0.6, all items are reliable, and the variables are accepted.

Table 6. Cronbach’s Alpha Coefficients

Variable	Number of Items	Cronbach’s Alpha, α N = 39
Digital Literacy	8	0.967

Perceived Usefulness	9	0.985
Perceived Ease of Use	9	0.970
Teachers' Intention	9	0.984
Teachers' Acceptance	9	0.982

Unidimensionality

The unidimensionality of the measurement model could be assessed using single or pooled measurements (Awang, 2015). However, in this study, the single measurement of each variable was used to run the analysis. The items with factor loading below 0.6 and squared multiple correlation, R2 less than 0.4, should be removed from the model. However, it is optional if the fitness indexes have already been achieved (Awang, 2015). The fitness indexes of single measurement models were also assessed and modified until the fitness indexes were achieved. The CFA was conducted in AMOS since it provides results graphically for straightforward interpretation.

Table 7 shows the summary of factor loading coefficients of all items obtained from the AMOS output during CFA. All of the factor loadings for every item are above 0.6, which shows that the items are reliable for the latent variables (Awang, 2012; Awang, 2015). Hence, no deletion of the items has been made; instead, there are only correlations since some of them might be redundant.

Table 7. Factor Loading Coefficients for All Items during CFA

Variables	Items	Factor Loading	Validity	Variables	Items	Factor Loading	Validity
DL	DL1	0.84	Yes	TI	TI1	0.97	Yes
	DL2	0.87	Yes		TI2	0.97	Yes
	DL3	0.89	Yes		TI3	0.94	Yes
	DL4	0.93	Yes		TI4	0.96	Yes
	DL5	0.87	Yes		TI5	0.96	Yes
	DL6	0.87	Yes		TI6	0.95	Yes
	DL7	0.91	Yes		TI7	0.95	Yes
	DL9	0.85	Yes		TI8	0.84	Yes
					TI9	0.86	Yes
PU	PU1	0.92	Yes	TA	TA1	0.91	Yes
	PU2	0.92	Yes		TA2	0.94	Yes
	PU3	0.94	Yes		TA3	0.96	Yes
	PU4	0.96	Yes		TA4	0.94	Yes
	PU5	0.95	Yes		TA5	0.94	Yes

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue III March 2026

	PU6	0.95	Yes		TA6	0.94	Yes
	PU7	0.95	Yes		TA7	0.91	Yes
	PU8	0.92	Yes		TA8	0.87	Yes
	PU9	0.93	Yes		TA9	0.90	Yes
PEOU	PEOU1	0.87	Yes				
	PEOU2	0.94	Yes				
	PEOU3	0.78	Yes				
	PEOU4	0.91	Yes				
	PEOU5	0.95	Yes				
	PEOU6	0.93	Yes				
	PEOU7	0.95	Yes				
	PEOU8	0.78	Yes				
	PEOU9	0.85	Yes				

Validity and Reliability

The pooled measurement model is constructed first based on a single measurement model that has been modified. The value of fitness indexes before modification shows that the model already achieves a good measurement model, as shown in Table 8. Discriminant validity is achieved when the value in each column does not exceed the value in the diagonal (bold) (Awang, 2015). Hence, the pooled measurement model was modified where some items were deleted (DL1, DL9, PEOU1, PEOU3, PEOU8, TA7, TA8, and TA9) until the model has achieved the requirement for discriminant validity, as shown in Table 9.

Table 8. The Fitness Indexes of Pooled Measurement Model

Fit Index		X^2/df < 5.00	RMSEA < 0.10	CFI > 0.90	TLI > 0.90
Index value	Before	2.192	0.071	0.943	0.939
	After	2.045	0.067	0.959	0.956

As shown in Table 9, the square root of AVE values for DL (0.883), PU (0.938), PEOU (0.922), TI (0.932), and TA (0.942) are generally higher than their respective inter-construct correlations, indicating acceptable discriminant validity. However, several correlations are relatively high, particularly between PU and PEOU ($r = 0.930$)**,** PU and TI ($r = 0.930$)**,** and PEOU and TI ($r = 0.920$)**.** Although such high correlations may raise potential discriminant validity concerns, they are theoretically consistent with the Technology Acceptance Model (TAM)**,** where PU and PEOU are strongly associated with behavioural intention toward technology use. Similar patterns of strong relationships among TAM constructs have been reported in recent studies (Al-Emran et al., 2020; Scherer et al., 2019). Therefore, while the constructs are closely related, the results still support acceptable discriminant validity within the theoretical framework of the study.

Table 9. Pooled Measurement Model Validation

	CR	AVE	Correlation (Discriminant Validity)				
	> 0.60	> 0.50	DL	PU	PEOU	TI	TA
DL	0.9612	0.7799	0.883				
PU	0.9850	0.8796	0.790	0.938			
PEOU	0.9716	0.8508	0.830	0.930	0.922		
TI	0.9815	0.8695	0.770	0.930	0.920	0.932	
TA	0.9792	0.8869	0.850	0.900	0.900	0.870	0.942

Normality Assessment

After the measurement model achieved all the validity and reliability requirements, the normality of the remaining items was assessed as shown in Table 10. In AMOS, the normality was assessed by observing the value of skewness and kurtosis of each item. The value of skewness must be lower than or equal to 1.0 to show that the data is normally distributed (Awang, 2015). It can also be assessed using kurtosis value; however, since SEM was conducted by AMOS, hence it is robust (Awang, 2015). It can also be assessed using kurtosis value; however, since SEM was conducted by AMOS which used Maximum Likelihood Estimator (MLE), hence it is robust (Awang, 2015). Since the skewness values for all items are below 1.0, the data is normally distributed. Hence, no items or outliers have been deleted.

Table 10. The Assessment of Normality Distribution for Items

Assessment of normality				
Variable	Skew	C.R.	Kurtosis	C.R.
DL2	-0.839	-5.261	0.993	3.113
DL3	-0.802	-5.028	1.126	3.531
DL4	-0.713	-4.475	1.269	3.981
DL5	-0.878	-5.506	1.198	3.756
DL6	-0.604	-3.788	1.010	3.166
DL7	-0.794	-4.980	1.316	4.126
PU1	-0.723	-4.537	1.499	4.700
PU2	-0.811	-5.085	1.443	4.524
PU3	-0.648	-4.067	1.175	3.684
PU4	-0.717	-4.494	1.417	4.442
PU5	-0.893	-5.603	2.176	6.822

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue III March 2026

PU6	-0.759	-4.758	1.667	5.228
PU7	-0.959	-6.018	2.521	7.907
PU8	-0.894	-5.608	1.679	5.264
PU9	-0.824	-5.170	1.770	5.550
PEOU2	-0.606	-3.793	1.183	3.711
PEOU4	-0.759	-4.762	1.100	3.448
PEOU5	-0.539	-3.381	1.174	3.683
PEOU6	-0.701	-4.399	1.505	4.719
PEOU7	-0.736	-4.616	1.466	4.598
PEOU9	-0.538	-3.376	0.621	1.949
TI1	-0.742	-4.653	1.040	3.261
TI2	-0.748	-4.691	1.341	4.204
TI3	-0.705	-4.424	1.311	4.112
TI4	-0.710	-4.452	1.259	3.949
TI5	-0.676	-4.242	1.107	3.471
TI7	-0.878	-5.507	1.561	4.894
TI8	-0.977	-6.128	1.893	5.936
TI9	-0.933	-5.850	1.843	5.781
TA1	-0.837	-5.251	1.644	5.155
TA2	-0.721	-4.523	1.364	4.278
TA3	-0.554	-3.474	0.981	3.077
TA4	-0.531	-3.327	0.900	2.823
TA5	-0.667	-4.181	1.234	3.870
TA6	-0.666	-4.179	1.063	3.333
Multivariate			632.766	92.920

**Digital Literacy (DL), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Teachers' Intention (TI), Teachers' Acceptance (TA)*

Structural Equation Modeling Analysis

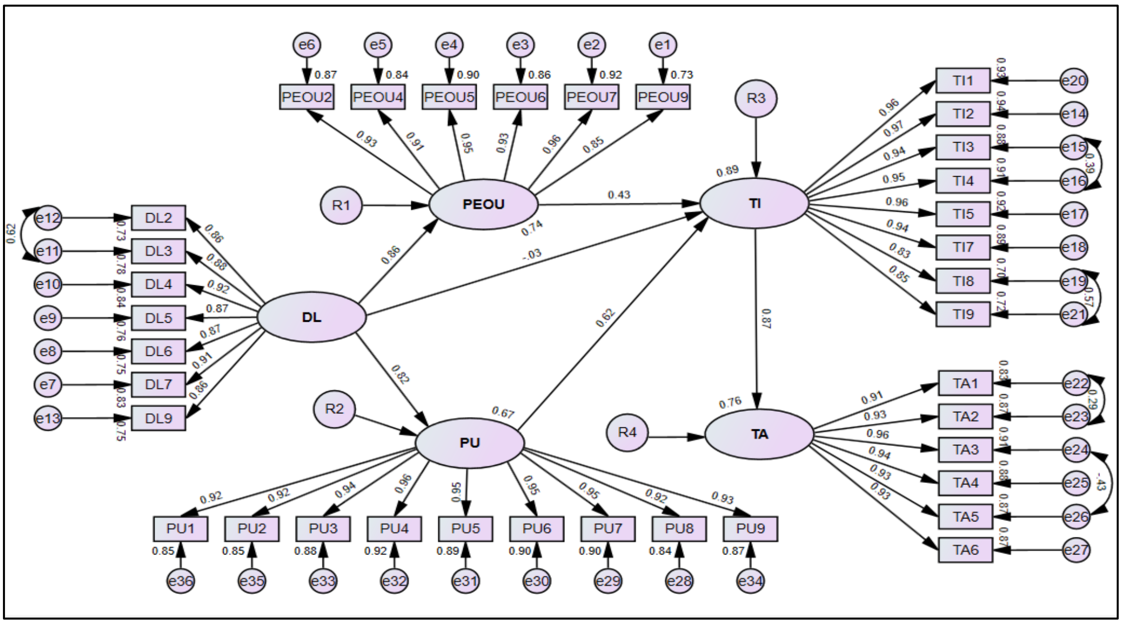

Figure 2: Final Structural Model

The final structural model was constructed based on the modified pooled measurement and proposed models, as shown in Figure 2. The structural model displays the relationship between factors as the proposed hypotheses, which were the relationship between DL with PU and PEOU, the relationship between TI with DL, PU, and PEOU, and the relationship between TI and TA. The result in Figure 2 shows that DL, PU, PEOU, and TI could estimate 76% of TA. As shown in Table 11, the fitness indexes of the final structural model are achieved. The RMSEA value can be accepted since it is still acceptable if within 0.05 and 0.10 (Awang, 2015) as stated in Table 1.

Table 11. The Fitness Indexes of the Final Structural Model

Fit Index	X^2/df < 5.00	RMSEA < 0.10	CFI > 0.90	TLI > 0.90
Index value	2.524	0.081	0.940	0.936

Hypothesis Testing

Table 12. The Regression Weights and Probability Value

	Estimate	S.E.	C.R.	P	Result
PU ← DL	0.727	0.047	15.399	***	Significant
PEOU ← DL	0.778	0.048	16.202	***	Significant
TI ← PEOU	0.418	0.037	16.202	***	Significant
TI ← PU	0.644	0.040	16.300	***	Significant
TI ← DL	-0.025	0.061	-0.409	0.683	Not Significant
TA ← TI	0.846	0.043	19.619	***	Significant

Table 12 shows the regression weight of each variable and its probability value, which indicates the causal effects of exogenous variables on their corresponding variables in the model. The result shows that DL significantly affects PU and PEOU. It shows that DL has a significantly positive relationship with PU and PEOU as DL increases by 1, PU and PEOU increase by 0.727 and 0.778, respectively. The results aligned with the previous findings even though they had different target respondents (Antonietti et al., 2022; Mailizar et al., 2022; Yao and Wang, 2024). The findings also show the same result where DL has slightly more association towards PEOU than PU (Antonietti et al., 2022). It may be because teachers with more knowledge of digital technologies might find them easier to use. However, it contradicts the study's findings by Kabakus et al. (2023) and Altan et al. (2024). For the study conducted by Kabakus et al. (2023), the findings might be different because of the different target population. Meanwhile, Altan et al. (2024) conducted a study with almost the same interest as this study, but they included techno-pedagogical content knowledge (TPACK), where the variable may affect the result. Nevertheless, as the results of this study show significant values, hence, H1 and H2 are supported.

Besides that, the output shows that there is no significant relationship between DL and TI (p-value = 0.683 > 0.05). It shows the consistent result as in Yao and Wang (2024). However, it contradicts the study's findings of Antonietti et al. (2022), which found that teachers' digital competence beliefs (TDCB) had a significant effect on behavioural intention (BI), and Altan et al. (2024), which proved the indirect effects of digital competence (DC) towards BI through PU and PEOU. It can be concluded that digital literacy might not be crucial in measuring teachers' intention to use technologies in their teaching. Some teachers who are knowledgeable in technologies may not intend to use technologies in their teaching, or they also need to use them if they are asked to do so. It could be because of their teaching subject or any other necessary reasons. Hence, from the findings, it can be concluded that H3 is not accepted in the study.

Meanwhile, PEOU and PU both indicate a significantly positive relationship with TI. It is consistent with the previous findings (Sarkam, 2019; Al-Abdullatif & Alsubaie, 2022). It also shows that PU had more significant relationship compared to PEOU towards TI as the same in study's findings in Yao and Wang (2024). The relationship can be concluded that the more useful the technologies are in their teaching, the more they intend to use them. They also might not be reluctant to train themselves to implement technologies as long as they are beneficial to them. Therefore, the fourth, H4, and fifth, H5, hypotheses are also accepted.

Lastly, TI indicates that there is a significantly positive relationship between TA. The result shows that TI is crucial in predicting TA ($\beta = 0.846$). The finding is consistent with Sarkam (2019), which states that the usage behaviour (UB) was affected by BI. Abdullatif and Alsubaie (2022) also stated the same finding, where BI significantly affected AU. While other studies did not include TA in their model, Atlan et al. (2024) concluded that when DC increases, it helps improve the PU and PEOU of teachers, and their intention to use technology also increases as a consequence. Hence, the more intention to use the technology, the more easily they can accept using it.

The study's findings could assist the Ministry of Education in addressing the issues caused by low levels of digital literacy among primary school teachers by offering guidance or individual sessions with technology experts to help them navigate the technology. They may organize workshops or events that allow teachers to handle digital technology in their teaching. For example, learning platforms with engaging and interactive features such as, Kahoot, Mentimeter, and Quizizz can be implemented in the classroom to facilitate two-way communication while provide better learning sessions to the students. It may also increase the students' interests towards learning despite the challenges and difficulties level of the learning subjects.

CONCLUSION

This study assessed the level of technology acceptance among primary school teachers by including digital literacy (DL) in the TAM. It was conducted to find whether DL plays a crucial part in identifying whether teachers are willing to use technology in the future. While previous studies did not include TA in their analysis, this study intends to measure the effects of existing variables in the TAM towards TA by observing whether the findings are significant. By including the TA in the model, the relationship can be measured and proven more clearly. SEM analysis was implemented frequently by previous researchers in analysing the TAM. The characteristic of SEM that can find a causal relationship between variables makes it more favourable among researchers to analyse TAM.

The study found that DL significantly affects perceived usefulness (PU) and perceived ease of use (PEOU), where PEOU is affected more than PU. Teachers with more knowledge will find it easier to use technology than those with less DL. Meanwhile, the study also found that DL does not affect teachers' intention (TI), consistent with some previous studies. It may be because DL might indirectly affect TI through PU or PEOU, which are not discussed in this study. While PU and PEOU significantly contribute to BI, they corroborate the previous research and have consistent results. Finally, the significant relationship between TI and teachers' acceptance (TA) provides a clear result that the more teachers intend to use technology, the more they are willing to use it.

ACKNOWLEDGEMENT

The author thanks the Ministry of Higher Education (MoHE) for supporting this research through the Fundamental Research Grant Scheme (FRGS) (Grant No. FRGS/1/2023/SS10/UITM/02/11), Universiti Teknologi MARA and Universiti Teknikal Malaysia Melaka for the support.

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ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue III March 2026

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